

Serial No.: 10/663,926

Confirmation No.: 2299

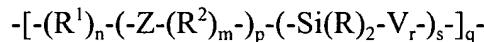
Filed: September 16, 2003

For: COMPOUNDS CONTAINING QUATERNARY CARBONS AND SILICON-CONTAINING GROUPS,
MEDICAL DEVICES, AND METHODS

Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the above-identified application:

1. **(Currently Amended)** A medical device comprising a segmented polymer comprising a soft segment comprising a group of the formula:



wherein:

n = 0 or 1;

m = 0 or 1;

p = 1-100,000;

r = 0-100,000;

s = 1-100,000;

q = 1-100,000;

R¹ and R² are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

Z is -C(R³)₂- wherein each R³ is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R³ groups within -C(R³)₂- can be optionally joined to form a ring;

each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms; and

V is -O-Si(R)₂- or R¹;

with the proviso that the polymer is substantially free of carbonate linkages.

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2. **(Original)** The medical device of claim 1 wherein p = 1-5000.
3. **(Original)** The medical device of claim 2 wherein p = 2-12.
4. **(Original)** The medical device of claim 1 wherein R¹ and R² are each independently a straight chain alkylene group, an arylene group, or combinations thereof.
5. **(Original)** The medical device of claim 4 wherein R¹ and R² are each independently a straight chain alkylene group.
6. **(Original)** The medical device of claim 1 wherein R¹ and R² are each independently groups containing up to 100 carbon atoms.
7. **(Original)** The medical device of claim 6 wherein R¹ and R² are each independently groups containing up to 20 carbon atoms.
8. **(Original)** The medical device of claim 7 wherein R¹ and R² are each independently groups containing 2 to 20 carbon atoms.
9. **(Original)** The medical device of claim 1 wherein each R³ is independently a straight chain alkyl group, an aryl group, or combinations thereof, optionally including heteroatoms.
10. **(Original)** The medical device of claim 9 wherein each R³ is independently a straight chain alkyl group, optionally including heteroatoms.

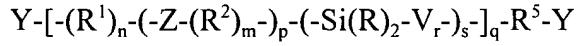
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11. **(Original)** The medical device of claim 10 wherein each R³ is independently a straight chain alkyl group containing 1 to 20 carbon atoms.
12. **(Original)** The medical device of claim 1 wherein the polymer further comprises a urethane group, a urea group, or combinations thereof.
13. **(Original)** The medical device of claim 12 wherein the polymer comprises a segmented polyurethane.
14. **(Original)** The medical device of claim 1 wherein the polymer is a biomaterial.
15. **(Original)** The medical device of claim 14 wherein the polymer is substantially free of ether, ester, and carbonate linkages.
16. **(Original)** The medical device of claim 1 wherein the polymer is linear, branched, or crosslinked.
17. **(Currently Amended)** A medical device comprising a segmented polymer comprising a soft segment prepared from a compound of the formula:



wherein:

each Y is independently OH or NR⁴H;

n = 0 or 1;

m = 0 or 1;

p = 1-100,000;

r = 0-100,000;

s = 1-100,000;

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$q = 1-100,000;$

R^1 , R^2 , and R^5 are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

Z is $-C(R^3)_2-$ wherein each R^3 is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R^3 groups within $-C(R^3)_2-$ can be optionally joined to form a ring;

each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

each R^4 is independently H or a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof; and

V is $-O-Si(R)_2-$ or R^1 ;

with the proviso that the polymer is substantially free of carbonate linkages.

18. **(Original)** The medical device of claim 17 wherein $p = 1-100$.
19. **(Original)** The medical device of claim 18 wherein $p = 2-12$.
20. **(Original)** The medical device of claim 17 wherein the number average molecular weight of the compound of the formula $Y-[-(R^1)_n-(-Z-(R^2)_m-)_p-(-Si(R)_2-V_r-)_s-]_q-R^5-Y$ is no greater than about 100,000 grams/mole.
21. **(Original)** The medical device of claim 20 wherein the number average molecular weight of the compound of the formula $Y-[-(R^1)_n-(-Z-(R^2)_m-)_p-(-Si(R)_2-V_r-)_s-]_q-R^5-Y$ is about 1000 grams/mole to about 1500 grams/mole.
22. **(Original)** The medical device of claim 17 wherein R^1 and R^2 are each independently a straight chain alkylene group, an arylene group, or combinations thereof.

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23. **(Original)** The medical device of claim 22 wherein R¹ and R² are each independently a straight chain alkylene group.
24. **(Original)** The medical device of claim 17 wherein R¹ and R² are each independently groups containing up to 100 carbon atoms.
25. **(Original)** The medical device of claim 24 wherein R¹ and R² are each independently groups containing up to 20 carbon atoms.
26. **(Original)** The medical device of claim 25 wherein R¹ and R² are each independently groups containing 2 to 20 carbon atoms.
27. **(Original)** The medical device of claim 17 wherein each R² includes at least two carbon atoms.
28. **(Original)** The medical device of claim 17 wherein each R³ is independently a straight chain alkyl group, an aryl group, or combinations thereof, optionally including heteroatoms.
29. **(Original)** The medical device of claim 28 wherein each R³ is independently a straight chain alkyl group, optionally including heteroatoms.
30. **(Original)** The medical device of claim 29 wherein each R³ is independently a straight chain alkyl group containing 1 to 20 carbon atoms.

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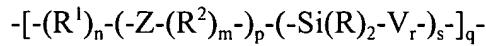
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31. **(Original)** The medical device of claim 17 wherein the polymer further comprises a urethane group, a urea group, or combinations thereof.
32. **(Original)** The medical device of claim 31 wherein the polymer comprises a segmented polyurethane.
33. **(Original)** The medical device of claim 17 wherein the polymer is a biomaterial.
34. **(Original)** The medical device of claim 33 wherein the polymer is substantially free of ether, ester, and carbonate linkages.
35. **(Original)** The medical device of claim 17 wherein each Y is OH.
36. **(Original)** The medical device of claim 17 wherein each R⁴ is independently H or a straight chain alkyl group.
37. **(Original)** The medical device of claim 36 wherein each R⁴ is independently a straight chain alkyl group containing 1 to 20 carbon atoms.
38. **(Original)** The medical device of claim 36 wherein each R⁴ is H.
39. **(Original)** The medical device of claim 17 wherein the polymer is linear, branched, or crosslinked.
40. **(Currently Amended)** A segmented polymer comprising a soft segment comprising a group of the formula:

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wherein:

 $n = 0 \text{ or } 1;$ $m = 0 \text{ or } 1;$ $p = 1\text{-}100,000;$ $r = 0\text{-}100,000;$ $s = 1\text{-}100,000;$ $q = 1\text{-}100,000;$

R^1 and R^2 are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

Z is $-C(R^3)_2-$ wherein each R^3 is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R^3 groups within $-C(R^3)_2-$ can be optionally joined to form a ring;

each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms; and

 V is $-O-Si(R)_2-$ or R^1 ;

with the proviso that the polymer is substantially free of carbonate linkages.

41. **(Original)** The polymer of claim 40 wherein $p = 1\text{-}5000$.
42. **(Original)** The polymer of claim 40 wherein $p = 2\text{-}12$.
43. **(Original)** The polymer of claim 40 wherein R^1 and R^2 are each independently a straight chain alkylene group, an arylene group, or combinations thereof.

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44. **(Original)** The polymer of claim 43 wherein R¹ and R² are each independently a straight chain alkylene group.

45. **(Original)** The polymer of claim 40 wherein R¹ and R² are each independently groups containing 2 to 20 carbon atoms.

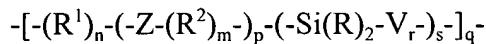
46. **(Original)** The polymer of claim 40 wherein each R³ is independently a straight chain alkyl group, an aryl group, or combinations thereof, optionally including heteroatoms.

47. **(Original)** The polymer of claim 46 wherein each R³ is independently a straight chain alkyl group, optionally including heteroatoms.

48. **(Original)** The polymer of claim 47 wherein each R³ is independently a straight chain alkyl group containing 1 to 20 carbon atoms.

49. **(Original)** The polymer of claim 40 which is linear, branched, or crosslinked.

50. **(Currently Amended)** A segmented polymer comprising a urethane group, a urea group, or combinations thereof, and a soft segment comprising a group of the formula:



wherein:

n = 0 or 1;

m = 0 or 1;

p = 1-100,000;

r = 0-100,000;

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s = 1-100,000;

q = 1-100,000;

R¹ and R² are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

Z is -C(R³)₂- wherein each R³ is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R³ groups within -C(R³)₂- can be optionally joined to form a ring;

each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms; and

V is -O-Si(R)₂- or R¹;

with the proviso that the polymer is substantially free of carbonate linkages.

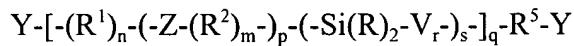
51. **(Original)** The polymer of claim 50 wherein p = 1-100.
52. **(Original)** The polymer of claim 51 wherein p = 2-12.
53. **(Original)** The polymer of claim 50 which is a segmented polyurethane.
54. **(Original)** The polymer of claim 50 which is a biomaterial.
55. **(Original)** The polymer of claim 54 which is substantially free of ether, ester, and carbonate linkages.
56. **(Original)** The polymer of claim 50 which is linear, branched, or crosslinked.
57. **(Currently Amended)** A segmented polymer comprising a soft segment prepared from a compound of the formula:

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wherein:

each Y is independently OH or NR⁴H;

n = 0 or 1;

m = 0 or 1;

p = 1-100,000;

r = 0-100,000;

s = 1-100,000;

q = 1-100,000;

R¹, R², and R⁵ are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

Z is -C(R³)₂- wherein each R³ is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R³ groups within -C(R³)₂- can be optionally joined to form a ring;

each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

each R⁴ is independently H or a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof; and

V is -O-Si(R)₂- or R¹;

with the proviso that the polymer is substantially free of carbonate linkages.

58. **(Original)** The polymer of claim 57 wherein p = 1-100.

59. **(Original)** The polymer of claim 58 wherein p = 2-12.

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60. **(Original)** The polymer of claim 57 wherein the number average molecular weight of the compound of the formula $Y-[-(R^1)_n-(-Z-(R^2)_m)_p-(-Si(R)_2-V_r)_s-]_q-R^5-Y$ is no greater than about 100,000 grams/mole.
61. **(Original)** The polymer of claim 57 wherein R^1 and R^2 are each independently a straight chain alkylene group, an arylene group, or combinations thereof.
62. **(Original)** The polymer of claim 61 wherein R^1 and R^2 are each independently groups containing up to 100 carbon atoms.
63. **(Original)** The polymer of claim 62 wherein R^1 and R^2 are each independently groups containing up to 20 carbon atoms.
64. **(Original)** The polymer of claim 63 wherein R^1 and R^2 are each independently groups containing 2 to 20 carbon atoms.
65. **(Original)** The polymer of claim 57 wherein each R^2 includes at least two carbon atoms.
66. **(Original)** The polymer of claim 57 wherein each R^3 is independently a straight chain alkyl group, an aryl group, or combinations thereof, optionally including heteroatoms.
67. **(Original)** The polymer of claim 66 wherein each R^3 is independently a straight chain alkyl group containing 1 to 20 carbon atoms.
68. **(Original)** The polymer of claim 57 wherein each Y is OH.

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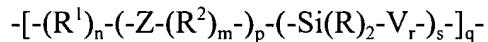
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69. **(Original)** The polymer of claim 57 wherein each R⁴ is independently H or a straight chain alkyl group.

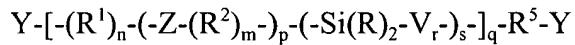
70. **(Original)** The polymer of claim 57 which is linear, branched, or crosslinked.

71-75. **(Cancelled)**

76. **(Currently Amended)** A method of making a segmented polymer comprising a soft segment comprising a group of the formula



the method comprising combining an organic compound containing two or more groups capable of reacting with hydroxyl or amine groups with a polymeric starting compound of the formula:



wherein:

each Y is independently OH or NR⁴H;

n = 0 or 1;

m = 0 or 1;

p = 1-100,000;

r = 0-100,000;

s = 1-100,000;

q = 1-100,000;

R¹, R², and R⁵ are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

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Z is $-C(R^3)_2-$ wherein each R^3 is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R^3 groups within $-C(R^3)_2-$ can be optionally joined to form a ring;

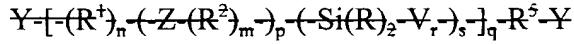
each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

each R^4 is independently H or a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof; and

V is $-O-Si(R)_2-$ or R^1-

with the proviso that the polymer is substantially free of carbonate linkages.

77. **(Withdrawn and Currently Amended) [[A]]** The method of claim 76 wherein the polymeric starting compound is prepared by a making a compound of the formula:



wherein:-

each Y is independently OH or NR^4H ;

n=0 or 1;

m=0 or 1;

p=1-100,000;

r=0-100,000;

s=1-100,000;

q=1-100,000;

R^1 , R^2 , and R^5 are each independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

~~Z is $-C(R^3)_2-$ wherein each R^3 is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms, wherein the two R^3 groups within $-C(R^3)_2-$ can be optionally joined to form a ring;~~

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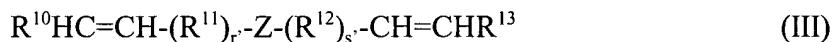
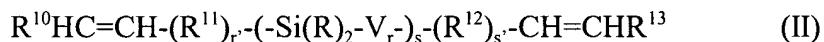
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each R is independently a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, optionally including heteroatoms;

each R' is independently H or a saturated or unsaturated aliphatic group, an aromatic group, or combinations thereof, and

V is -O-Si(R)₂- or R'⁺,

the method comprising combining monomers of Formula II or Formula III



wherein:

r, s, V, Z, and R are as defined above;

r' = 0 or 1;

s' = 0 or 1;

R¹⁰ and R¹³ are each independently hydrogen or straight chain, branched, or cyclic alkyl groups containing up to 6 carbon atoms; and

R¹¹ and R¹² are each independently a saturated aliphatic group, an aromatic group, or combinations thereof;

with an alkene metathesis catalyst and optionally applying a vacuum.